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MEMORANDUM

DATE: 4 November 1998

TO: David Bennett, WAM, U.S. EPA, Region X

FROM: Michelle Turner, Chemist, WESTON, Seattle
~~KNm~~ Roger McGinnis, Senior Environmental Chemist, WESTON, Seattle

SUBJECT: Validation of Polychlorinated Biphenyls (Congeners) Data
Laboratory Batch: K9805457
Site: Duwamish River

WORK ASSIGNMENT NO. 46-23-0JZZ

WORK ORDER NO.: 4000-019-038-5200-00

DOC. CONTROL NO.: 4000-019-038-AAAK

cc: Bruce Woods, RAP-WAM, U.S. EPA, Region X
Dena Hughes, Site Manager, WESTON, Seattle
Kevin Mundell-Jackson, Database Management, WESTON, Seattle

The quality assurance review of nine sediment samples, laboratory batch K9805457, collected from the Duwamish River has been completed. Samples were analyzed for polychlorinated biphenyls as individual congeners using EPA Method 8082 by Columbia Analytical Services of Kelso, Washington. The samples were numbered:

98334028	98334029	98334030	98334031	98334032
98334033	98334034	98334035	98334036	

Data Qualifications

The following comments refer to the laboratory performance in meeting the quality control criteria described in the technical specifications of the laboratory subcontract. The review follows the format described in the *National Functional Guidelines for Organic Data Review* (EPA OSWER Directive 9240 1-05, February 1994).

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Site: Duwamish River

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1. Timeliness

All samples met holding time criteria of 14 days for sample extraction and 40 additional days for extract analysis.

2. Initial Calibration

A six point initial calibration was performed using tetrachloro-meta-xylene (TCMX) as an internal standard. Relative response factors (RRF) were calculated for each target congener. The RRF percent relative standard deviation (%RSD) was less than 20 percent for all analytes.

3. Calibration Verification

Calibration verification standards were analyzed every 12 hours using a midrange standard. The RRF percent difference was less than 25 percent of the initial calibration value.

4. Retention Time Windows

Relative Retention Time Windows were calculated from initial calibration. Retention times for calibration verification standards were within established windows of ± 0.06 RRT.

5. Detection Limits

Instrument detection limits met project required quantitation limits with the following exceptions:

Sample	Compound	QL Goal ($\mu\text{g}/\text{kg}$)	Reported QL ($\mu\text{g}/\text{kg}$)
98334028	PCB66	1	15
98334028	PCB123	1	2
98334028	PCB138	1	19
98334029	PCB66	1	4
98334029	PCB138	1	5

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Sample	Compound	QL Goal ($\mu\text{g}/\text{kg}$)	Reported QL ($\mu\text{g}/\text{kg}$)
98334030	PCB66	1	6
98334031	PCB66	1	10
98334031	PCB123	1	2
98334032	PCB66	1	6
98334032	PCB138	1	8
98334033	PCB66	1	9
98334033	PCB138	1	14
98334034	PCB66	1	10
98334035	PCB66	1	10
98334035	PCB105	1	3
98334035	PCB138	1	8
98334035	PCB187	1	4
98334036	PCB123	1	2

Where quantitation limit goals were exceeded, undetected analytes were qualified (U) to indicate matrix interference

6 Blanks

a) Laboratory Method Blanks

Laboratory method blank frequency criteria were met.

No target analytes were reported in laboratory method blanks.

b) Field Blanks

No field blanks were associated with this laboratory batch

7. System Monitoring Compounds (Surrogates)

Hexabromobiphenyl (HBB) was used as a surrogate Surrogate compound percent recovery met quality control criteria for all samples.

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8. Matrix Spike and Matrix Spike Duplicate

Matrix spike (MS) or matrix spike duplicate (MSD) percent recovery for the following compounds were outside QC guidelines.

Sample	Compound	Percent Recovery	QC Limits
K9805485-MS	PCB52	57	60-140
K9805485-MS	PCB66	145	60-140
K9805485-MS	PCB101	9	60-140
K9805485-MS	PCB118	54	60-140
K9805485-MS	PCB153	45	60-140
K9805485-MS	PCB105	54	60-140
K9805485-MS	PCB138	158	60-140
K9805485-MS	PCB187	57	60-140
K9805485-MS	PCB128	58	60-140
K9805485-MS	PCB180	43	60-140
K9805485-MS	PCB170	58	60-140
K9805485-DMS	PCB66	163	60-140
K9805485-DMS	PCB101	26	60-140
K9805485-DMS	PCB153	48	60-140
K9805485-DMS	PCB138	175	60-140
K9805485-DMS	PCB180	55	60-140

All relative percent differences between the MS and MSD recoveries were within QC guidelines. The MS and MSD samples associated with this SDG were batch QC and not necessarily samples from this SDG. No action was taken based solely on MS/MSD data.

9. Laboratory Control Sample (LCS) Analysis

LCS percent recoveries were outside the QC limits for the following compounds

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Sample	Compound	Percent Recovery	QC Limits
K980820-LCS	PCB18	61	70-130
K980820-LCS	PCB28	66	70-130
K980820-LCS	PCB52	63	70-130
K980820-LCS	PCB44	64	70-130
K980820-LCS	PCB101	64	70-130
K980820-LCS	PCB81	64	70-130
K980820-LCS	PCB123	67	70-130
K980820-LCS	PCB114	67	70-130
K980820-LCS	PCB153	67	70-130
K980820-LCS	PCB105	67	70-130
K980820-LCS	PCB138	63	70-130
K980820-LCS	PCB187	66	70-130
K980820-LCS	PCB128	66	70-130
K980820-LCS	PCB167	69	70-130
K980820-LCS	PCB156	66	70-130
K980820-LCS	PCB157	64	70-130
K980820-LCS	PCB180	67	70-130
K980820-LCS	PCB170	67	70-130
K980820-LCS	PCB189	67	70-130
K980820-LCS	PCB195	66	70-130

Results for compounds listed above were qualified as estimated (J). Undetected compounds were also qualified as estimated (UJ).

10 Field Duplicate Analysis

No field duplicates were associated with this SDG



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Site. Duwamish River

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11. Second Column Confirmation

The relative percent difference (RPD) in reported analyte concentration was greater than 35 percent for the primary and confirmation column for the following samples:

Sample Number	Compound	DB-5 Conc. ($\mu\text{g}/\text{kg}$)	DB-608 Conc ($\mu\text{g}/\text{kg}$)	RPD
98334028	PCB18	2	4	67
98334028	PCB28	4	7	55
98334028	PCB101	6	10	50
98334028	PCB123	14	2	150
98334028	PCB138	19	10	62
98334029	PCB28	1	2	67
98334029	PCB52	2	4	67
98334029	PCB101	1	2	67
98334029	PCB118	2	3	40
98334029	PCB187	1	2	67
98334029	PCB170	2	1	67
98334030	PCB28	2	3	40
98334030	PCB52	2	5	85
98334030	PCB44	1	2	67
98334030	PCB101	2	3	40
98334030	PCB138	8	4	67
98334031	PCB28	2	4	67
98334031	PCB52	4	7	55
98334031	PCB101	3	5	50
98334031	PCB123	11	1	167
98334031	PCB138	13	7	60
98334031	PCB195	1	2	67
98334031	PCB206	1	2	67

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Sample Number	Compound	DB-5 Conc (µg/kg)	DB-608 Conc (µg/kg)	RPD
98334032	PCB28	2	3	40
98334032	PCB52	2	4	67
98334032	PCB101	2	3	40
98334032	PCB138	8	4	67
98334033	PCB52	4	8	67
98334033	PCB44	2	3	40
98334033	PCB138	14	8	55
98334033	PCB156	2	1	67
98334033	PCB195	1	2	67
98334034	PCB18	1	2	67
98334034	PCB28	3	5	50
98334034	PCB52	4	7	55
98334034	PCB138	14	7	67
98334034	PCB195	1	3	100
98334035	PCB18	1	2	67
98334035	PCB28	3	5	50
98334035	PCB52	4	8	67
98334035	PCB44	2	3	40
98334035	PCB138	13	7	60
98334035	PCB156	2	1	67
98334036	PCB18	1	2	67
98334036	PCB28	3	5	50
98334036	PCB52	4	9	77
98334036	PCB44	2	3	40
98334036	PCB101	4	6	40
98334036	PCB123	11	1	167
98334036	PCB138	13	7	60

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Differences can arise from analytical interferences on one column. However, the RPDs are not deemed significant at the reported concentrations. The lower concentration was reported for each analyte, unless interferences or coelution prevented use of the lower concentration.

12. Sample Analysis

A cursory review of raw data was performed. All laboratory deliverables were present and complete. A duplicate analysis was performed on sample 98334029. RPD values for PCB28, PCB44, PCB101, PCB118, PCB153, PCB187, PCB180 and PCB170 were high, although no QC limits for sample replicates have been established. The case narrative indicates that the high RPDs resulted when analyte concentrations were at or near the method reporting limit. As results were previously qualified as estimates based on LCS data, no additional qualifiers were assigned. The case narrative also notes that several congeners in the LCS and batch MS/MSD did not meet QC requirements and were flagged as such. No other complications were noted

13. Laboratory Contact

The laboratory was not contacted.

Data Assessment

Upon consideration of the data qualifications noted above, the data are ACCEPTABLE for use except where flagged with data qualifiers that modify the usefulness of the individual values.

Data Qualifiers

U - The compound was analyzed for, but was not detected.

UJ - The compound was analyzed for, but was not detected. The associated quantitation limit is an estimate because quality control criteria were not met.

J - The analyte was positively identified, but the associated numerical value is an estimated quantity because quality control criteria were not met or because concentrations reported are less than CRDL or lowest calibration standard

R - Quality control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification

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N - Presumptive evidence of presence of material (tentative identification).

I - Elevated reporting limit due to matrix interference.

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98-06261 003
DCN 4000-019-038- AAAK

4 November 1998
Region X

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334028	Units	ug/Kg (ppb)
Lab Code	K9805457-001	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	4 J	
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	7 J	
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	5 J	
PCB 66	EPA 3550B	8082	15	1	8/20/98	8/26/98	ND 15 UJB	
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	10 J	
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	NB 1 UJ	
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	2	1	8/20/98	8/26/98	ND 2 UJB	
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	10	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND 1 UJ	
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	12 J	
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	5 J	
PCB 138	EPA 3550B	8082	19	1	8/20/98	8/26/98	ND 19 UJB	
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	6 J	
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	NB 1 UJ	
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	9 J	
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	6 J	
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND 1 UJ	
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

B

The MRL is elevated because of matrix interferences

Approved By 1840621397p

Sandra Neuneker

Date 9-3-98

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Roy F Weston, Inc	Service Request:	K9805457
Project:	Duwamish River/4000-027-001-2019-38	Date Collected:	8/12/98
Sample Matrix:	Sediment	Date Received:	8/13/98

Congener Specific PCBs

Sample Name	98334029	Units	ug/Kg (ppb)
Lab Code	K9805457-002	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 66	EPA 3550B	8082	4	1	8/20/98	8/26/98	ND	4LLJ B
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	2	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 138	EPA 3550B	8082	5	1	8/20/98	8/26/98	ND	5LLJ B
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 LLJ	
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	LLJ
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

B

The MRL is elevated because of matrix interferences

Approved By
1S4/021397p

Zonda Neuneker

Date 9-3-98

00028

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334030	Units	ug/Kg (ppb)
Lab Code	K9805457-003	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 66	EPA 3550B	8082	6	1	8/20/98	8/26/98	ND	6 (L) J B
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	3	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	6 J	
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 138	EPA 3550B	8082	1	1	8/20/98	8/26/98	8 J	
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	4 J	
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 uJ
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

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The MRL is elevated because of matrix interferences

Approved By
IS44/021397p

Zonda Neuneker

Date 9-3-98

00029

WCT 10/23/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334031	Units	ug/Kg (ppb)
Lab Code	K9805457-004	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UJ
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	4 J	
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 66	EPA 3550B	8082	10	1	8/20/98	8/26/98	ND	10 UJ B
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	5 J	
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UJ
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	2	1	8/20/98	8/26/98	ND	2 UJ JB
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	7	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UJ
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	9 J	
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 138	EPA 3550B	8082	1	1	8/20/98	8/26/98	13 J	
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	5 J	
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UJ
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UJ
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	8 J	
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	4 J	
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UJ
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

B

The MRL is elevated because of matrix interferences

Approved By 1844021397p

Zonda Meuneker Date 9-3-98

00030

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334032	Units	ug/Kg (ppb)
Lab Code	K9805457-005	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I JJ
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 66	EPA 3550B	8082	6	1	8/20/98	8/26/98	ND	6 UJ I J
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	4	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	6 J	
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	2 J	
PCB 138	EPA 3550B	8082	8	1	8/20/98	8/26/98	ND	8 U J JB
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	1 J	
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	5 J	
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	3 J	
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	I UJ
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

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The MRL is elevated because of matrix interferences

Approved By: 184021397p

Sandra Neuneker

Date 9-3-98

00031

WCF 11/23/98

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334033	Units ug/Kg (ppb)
Lab Code	K9805457-006	Basis Dry
Test Notes		

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	2	J
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	3	J
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	4	J
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	2	J
PCB 66	EPA 3550B	8082	9	1	8/20/98	8/26/98	ND	9 UI J
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	4	J
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UI J
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UI J
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	6	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UI J
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	10	J
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	3	J
PCB 138	EPA 3550B	8082	14	1	8/20/98	8/26/98	ND	14 UI JB
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	6	J
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	2	J
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UI J
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	J
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UI J
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	10	J
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	6	J
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1 UI J
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	J
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

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The MRL is elevated because of matrix interferences

Approved By 1S4021397p

Zonda Reuneker Date 9-3-98

00032

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334034	Units	ug/Kg (ppb)
Lab Code	K9805457-007	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	J
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	3	J
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	4	J
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	3	J
PCB 66	EPA 3550B	8082	10	1	8/20/98	8/26/98	ND	10/J J B
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	5	J
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1/J J
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1/J J
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	6	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1/J J
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	9	J
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	3	J
PCB 138	EPA 3550B	8082	1	1	8/20/98	8/26/98	14	J
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	5	J
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	2	J
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1/J J
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	J
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1/J J
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	9	J
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	5	J
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	1/J J
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	1	J
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

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The MRL is elevated because of matrix interferences

Approved By 1844021397p

Wanda Neuneker

Date 9-3-98

00033

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334035	Units	ug/Kg (ppb)
Lab Code	K9805457-008	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/27/98	1	J
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/27/98	3	J
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/27/98	4	J
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/27/98	2	J
PCB 66	EPA 3550B	8082	10	1	8/20/98	8/27/98	ND	10 UJ B
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/27/98	5	J
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	1 UJ
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 123	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	1 UJ
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/27/98	6	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	1 UJ
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/27/98	9	J
PCB 105	EPA 3550B	8082	3	1	8/20/98	8/27/98	ND	3 UJ B
PCB 138	EPA 3550B	8082	8	1	8/20/98	8/27/98	ND	8 UJ B
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 187	EPA 3550B	8082	4	1	8/20/98	8/27/98	ND	4 UJ B
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/27/98	2	J
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	1 UJ
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/27/98	1	J
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	1 UJ
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/27/98	7	J
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/27/98	5	J
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	1 UJ
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	1 UJ
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	

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The MRL is elevated because of matrix interferences

Approved By 184021397p

Zonda Meuneker

Date 9-3-98

00034

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: 8/12/98
Date Received: 8/13/98

Congener Specific PCBs

Sample Name	98334036	Units	ug/Kg (ppb)
Lab Code	K9805457-009	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/27/98	1 J	
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/27/98	3 J	
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/27/98	4 J	
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/27/98	2 J	
PCB 66	EPA 3550B	8082	1	1	8/20/98	8/27/98	10	
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/27/98	6 J	
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND 1 UJ	
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 123	EPA 3550B	8082	2	1	8/20/98	8/27/98	ND 2 UJ	J
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/27/98	6	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND 1 UJ	
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/27/98	9 J	
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/27/98	3 J	
PCB 138	EPA 3550B	8082	1	1	8/20/98	8/27/98	13 J	
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/27/98	4 J	
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/27/98	2 J	
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND 1 UJ	
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/27/98	1 J	
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND 1 UJ	
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/27/98	7 J	
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/27/98	4 J	
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND 1 UJ	
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND 1 UJ	
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/27/98	ND	

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The MRL is elevated because of matrix interferences

Approved By

Sandra Meunster

Date 9-3-98

00035

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Roy F Weston, Inc
Project: Duwamish River/4000-027-001-2019-38
Sample Matrix: Sediment

Service Request: K9805457
Date Collected: NA
Date Received: NA

Congener Specific PCBs

Sample Name	Method Blank	Units	ug/Kg (ppb)
Lab Code:	K980820-MB	Basis	Dry
Test Notes			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
PCB 18	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 28	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 52	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 44	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 66	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 101	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 81	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 77	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 123	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 118	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 114	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 153	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 105	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 138	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 126	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 187	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 128	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 167	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 156	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 157	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 180	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 169	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 170	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 189	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 195	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 206	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	
PCB 209	EPA 3550B	8082	1	1	8/20/98	8/26/98	ND	

Approved By: Zonda Neuneker Date 9-3-98

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